

An Unusual Case of Candida Infection Producing a Fungus Ball in the Left Atrial Cavity

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ABSTRACT

We report the case of a 75-year-old male patient who was treated in our clinic for septicemia and subacute infective endocarditis caused by toxigenic *Candida albicans*. Transthoracic echocardiography revealed the presence of a thrombus in the left atrial cavity, and the diagnosis was confirmed by computerized tomography. The patient was operated on urgently. Histological examination of the embolic material removed from the left atrium showed the presence of yeast and hyphal forms of *Candida albicans* through periodic acid-Schiff stain. The patient was readmitted to the hospital on postoperative day 15, because of reembolism, and died later on. Here we present our approach to the diagnosis and treatment of this rare condition.

INTRODUCTION

Candida endocarditis is very rare manifestation of candidiasis, and early diagnosis and treatment are very important in such cases. It is commonly diagnosed through symptoms of embolism. In the literature there have been reported embolic phenomena that often involved major vessels, such as the pulmonary artery, the aorta, or the cerebral artery [Chinen 2009; Salmi 2010; Kraev 2011]. The clinical symptoms depend on the supplying area of the affected vessels. The optimal method of treatment is a matter of debate, but it is usually accepted that amphotericin B should be routinely used to treat invasive candidiasis, and that the infected tissue should be removed by surgical intervention. To our

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knowledge, this is the first case that involves the simultaneous development of acute myocardial infarction and stroke on account of a fungus ball produced in the left atrial cavity by *Candida* infection.

CASE REPORT

A 75-year-old male patient was admitted to our clinic with dysarthria and paresis of his left arm, complaints that had developed 10 days after a spine stabilization surgery. Prophylaxis for deep vein thrombosis (low molecular weight heparin) had been used postoperatively. The patient's medical history revealed that 20 years earlier he had had chronic obstructive pulmonary disease and undergone left pneumonectomy on account of lung cancer. There were no other pathological findings on his physical examination. An electrocardiogram showed ST elevations in the anterior and inferior derivations. No obstruction was observed in any of the coronary arteries.

The patient immediately underwent brain diffusion-weighted magnetic resonance imaging (DWI) and echocardiographic examination. The brain DWI showed the existence of several areas of acute embolic infarction (Figure 1). The transthoracic echocardiography revealed an echogenic structure (2 × 2 cm) that was diagnosed as an atrial thrombus (Figure 2). In addition, there was dyskinesia as well as high pulmonary artery pressure (50 mmHg). A computerized tomography (CT) scan of the chest confirmed the presence of a mass in the left atrium (Figure 3A). The patient underwent immediate surgery with cardiopulmonary bypass, and the clot and the cystic mass (located between the left atrial appendage and the right pulmonary vein in the left atrium) were removed. The operation material was sent to the pathology laboratory. In the follow-up, *Candida albicans* grew in the urine culture that had been performed because the patient reported a burning sensation during urination, and oral fluconazole treatment was started because it has been found to be effective against *Candida*. The patient's symptoms improved during the postoperative period, and he was discharged under treatment with oral fluconazole.

Six days later, however, the patient was readmitted to our hospital with fever. He was transferred to the intensive care unit. CT imaging of the chest revealed multiple

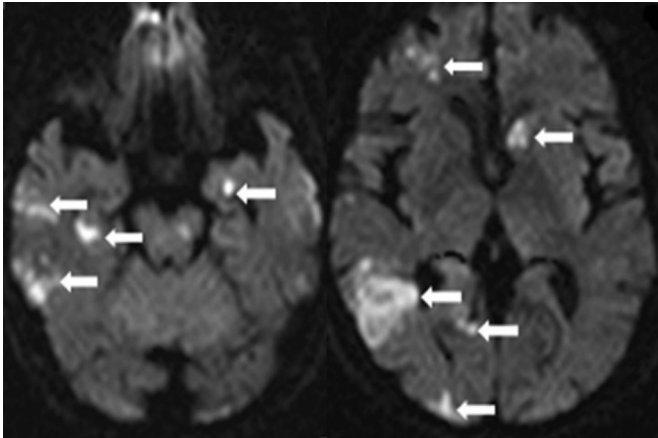


Figure 1. On the brain DWI, many areas of the cytotoxic edema are seen in the brain parenchyma as diffusion restriction areas on account of the acute embolic infarction (white arrows).

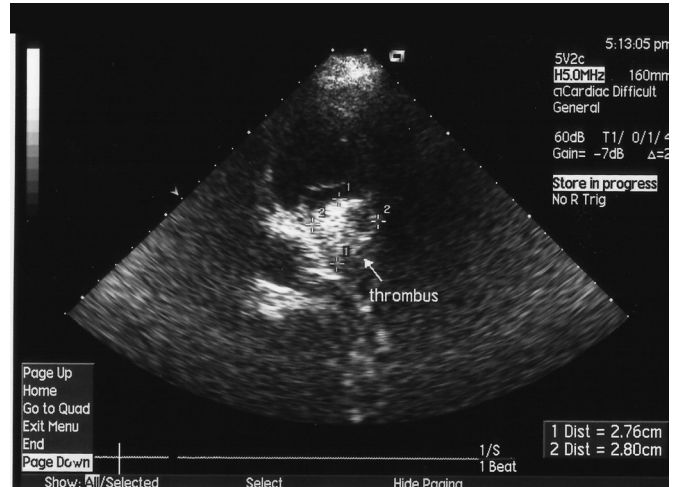


Figure 2. Transthoracic echocardiography reveals an echogenic structure.

focal patchy pneumonic infection areas in the right lung parenchyma (Figure 4) and postoperative reactive tissue changes in the left atrium (Figure 3B). According to the laboratory investigations, hemoglobin was 10.2 g/dL, white cell count 22.3 k/ μ L (92.6% neutrophils), platelets 270 k/ μ L, blood urea nitrogen 24 mg/dL, creatinine 1.6 mg/dL, and C-reactive protein 195.08 mg/L. The histopathological examination that was performed on the mass extracted during surgery yielded results consistent with thrombus. Moreover, yeast and hyphal forms of *Candida albicans* were detected in the thrombus through periodic acid-Schiff (PAS) stain (Figure 5). As treatment, the administration

of amphotericin B was immediately started (50 mg daily). Then methicillin-resistant *Staphylococcus aureus* (MRSA) grew in the blood culture, making it necessary to begin deep tracheal aspirate cultures and treatment with 1200 g/day intravenous linezolid. The subsequent control blood cultures were negative.

Approximately 30 days after the operation, *Escherichia coli* grew in the blood and urine cultures (in the cultures that were taken on the day of the patient's death). The patient failed to show any improvement and eventually died on account of urinary sepsis.

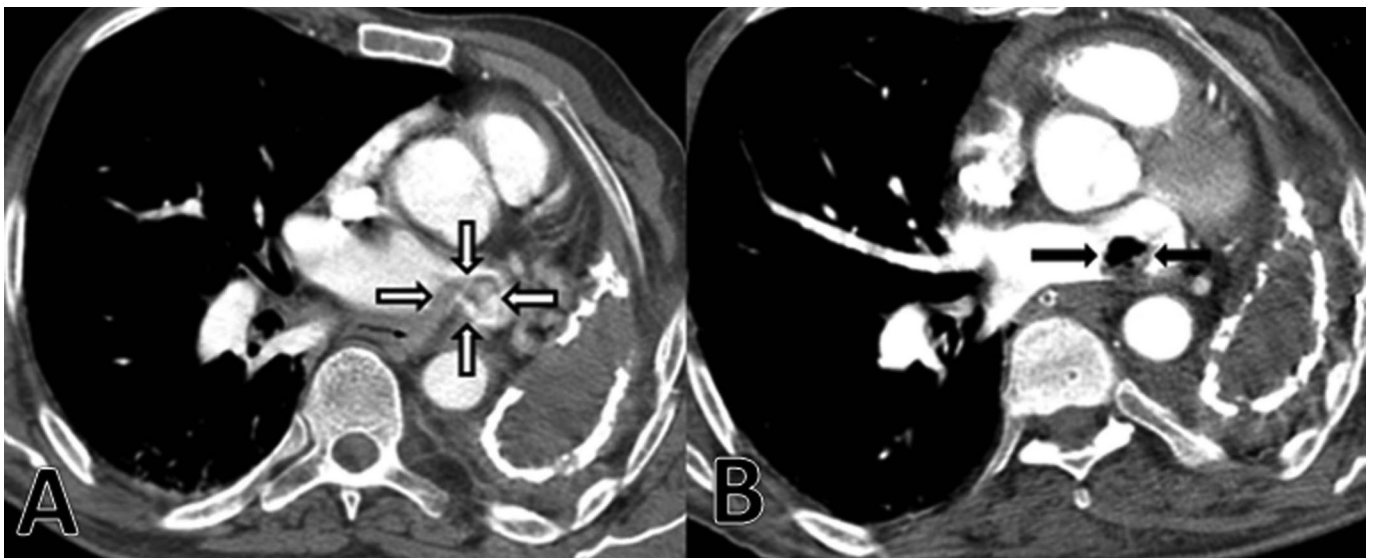
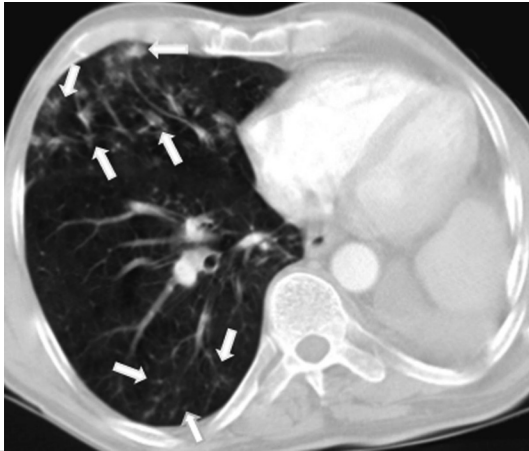


Figure 3. (A) The first contrast-enhanced CT imaging of the chest reveals a mass that is considered to be a left atrial thrombus (white arrows). (B) After the surgery, postoperative tissue changes are observed on the second contrast-enhanced CT imaging of the chest (black arrows).



DISCUSSION

Figure 4. On the CT imaging of the chest, in the right lung parenchyma, multiple focal patchy pneumonic infection areas are observed (white arrows).

Infections of intracardiac thrombi, which are associated with aneurysms that may emerge as a complication of transmural myocardial infarction, are extremely rare [Ruiz-Bailén 2009]. The etiologic agents most frequently involved in such cases are Gram-negative bacilli [Schofield 1986; Cheung 1990] (*Escherichia coli*, *Klebsiella pneumoniae*, or *Salmonella* species) and *Staphylococcus aureus* [Ruiz-Bailén 2009]. Fungal infections are an infrequent cause of infective endocarditis, as they make up less than 10% of the cases; native valve endocarditis is particularly infrequent [Ellis 2001]. Approximately 24% of the cases of fungal endocarditis are caused by *Candida albicans*. It is usually seen in patients with valvular disease, intravenous drug use, indwelling vascular lines, or immunocompromised conditions [Ellis 2001]. In our case, the patient had none of the risk factors mentioned above, so we considered that the fungal infection could have been caused by systemic thromboembolism.

Echocardiography constitutes a very useful tool for diagnosis in such cases: Two-dimension echocardiography makes it possible to detect 80%-85% of the *Candida* vegetations [Popp 1980; McFadden 1985]. Transesophageal echocardiography is commonly accepted to be a more useful diagnostic method for cardiac vegetation than transthoracic echocardiography, but it was not available for our patient at the time of the clinical evaluation, so the diagnosis was confirmed with CT scans. For a definite diagnosis, histological confirmation was obtained as well.

Amphotericin B is currently the gold standard in the treatment of such cases, with or without 5-flucytosine or an echinocandin [Pappas 2009]. Because the latter drugs (5-flucytosine and micafungin) are not found in Turkey, however, the treatment had to continue only with amphotericin B. Despite this we have reason to believe that the patient did not die of inadequate antifungal therapy, but rather on account of urinary sepsis induced by an *E. coli* infection.

The most common cause of acute myocardial infarction is atherosclerosis, and various other causes are cited as well. But a case of acute myocardial infarction that stems from the coronary embolization of a *Candida* fungus is unprecedented in the literature.

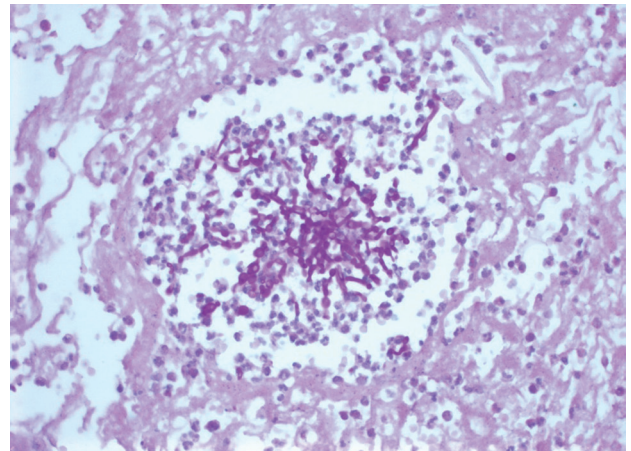


Figure 5. Histologically, through PAS stain (×40), the cardiac thrombus is found to consist of yeast and hyphal forms of *Candida albicans*.

Normal coronary angiography suggested the presence of an embolic infarction in our patient. Acute myocardial infarction and stroke are rarely observed at the same time. Thus it was considered worthwhile to report this rather unusual case of a patient with a *Candida*-induced fungus ball in the left atrium and its complications. The importance of early diagnosis and treatment for *Candida* endocarditis is also thrown into relief by this report.

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